Docket No.: 0649-1070PUS1

(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Tatsuya IGARASHI et al.

Application No.: 10/530,289

Confirmation No.: 7753

Filed: April 5, 2005

Art Unit: 1794

For: ORGANIC ELECTROLUMINESCENT

Examiner: D. L. Garrett **DEVICE**

DECLARATION UNDER 37 C.F.R. § 1.132

Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450

Madam:

I, Toshihiro Ise, declare and say as follows:

I am named as a co-inventor of the above-identified application.

The Ip of the hole injection/transport compound (eV) (labeled in the attached Table as "Ip of H") and the Ea of the electron injection/transport compound (eV) (labeled in the attached Table as "Ea of E") are additionally described in the Table of the previously submitted test data. Furthermore, "O" is provided under "condition for T1" in the attached Table when the limitation "the electron injection/transport compound, the hole injection/transport compound, and the green or blue phosphorescent compound each has a T_1 value of 62 kcal/mole or more" is met, and "x" is provided when the limitation is not met.

As shown in the attached Table, it is extremely difficult to meet both of the conditions for Ip and Ea and the condition for T1. In fact, only the inventive examples and not the comparative examples meet all of the conditions.

Application No. 10/530,289 Declaration under 37 C.F.R. § 1.132

Attorney Docket No.: 0649-1070PU1

The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S. Code 1001 and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

By: Toshihiro Ise Date: Aug. 11, 2009
Dr. Toshihiro Ise

| ive Example 1 ive Example 2 ive Example 3 ive Example 3 ive Example 3 ive Example 1 ive Example 2 ive Example 3 ive Example 4 ive Example 5 ive Example 4 ive Example 5 ive Example 4 ive Example 5 ive Example 5 ive Example 5 ive Example 6 iv | Additional Example | TO C BASING SOUNDS CONTRACTOR | External quantum efficiency | durability (¢500cd/m | In of H | Es of E | condition for 71 |
|--|--|--|--------------------------------|-------------------------|---------|---------|---------------------|
| 1.0 Care(10)NPG)50909044-1-0 (00A) FIGH 1094(00A) FIGH 100A (01A) No light emission 2.9 2.9 1.0 Care(10)NPG)50909044-1-0 (00A) FIGH 1094(00A) FIGH 100A (01A) No light emission 2.9 | nal Connamic Constilled | 11.0 C. dr.C(10), N.P.U(30)/80%C.BP+10% [PBI+10%(II]ppy13(36)/ET-2(36)/LIF/AI | %08'9 | 15001 | 5.9 | 672 | 0 |
| C. | nal Comamarina Gustalla | 11 U.C. Urc(10) NPU(30)/80%H-34+10%TPBI+10%Ir(ppy)3(36)/ET-2(36)/LiF/AI | 0.10% | 4Sh | 5.7 | 5.5 | × |
| Contect (UNYPOS) 2000 PMS - 1 UNAPER - 1 U | nal Comparative Evanuel | 11 O'C. U.C. (10) "XPL(10V) 8074H-4+10" PBI+10%ITppy13(36):ET-2(36)(L.F/A) | No light emission | | 5.7 | 2.9 | × |
| The control (UNPPE) SQURGERS UNPERTED UNDER LANGE LA | nal Comparative Examples | 17.0. C. D. L. | 0.10% | 38ħ | 5.6 | 5.9 | × |
| COCRECTORYPOSOSORIAN-LITERATERINATION CONTROLLEGION CONT | nal Connarative Evaluates | TO DATE OF THE STATE OF THE | No light emission | | 5.6 | 5.5 | × |
| 100.cmet(0)/PPG/S090844-21-10/17EH 1-10/MEDPJ/30/ET-23-0/LF/M No light emission 15 2 2 | nal Comparative Evapoles | 170/C.B.(10/A) BD(60) 608/11 10 (60/1755) | 0.20% | 250 | 5.6 | 8.2 | × |
| TOCACREGIONPESSORMEM-13-108/TPB1-108/LPB2/13-108/LFBA | Companying Every | 1100 Line (10) / 10 / 10 / 10 / 10 / 10 / 10 / 10 / | No light emission | | 6.6 | 2.8 | × |
| If COC. (CALCHO (OPPEDSO) 8000641-101-1016/1019/13-60/1617-13-09/167/16/16/1019/1019/1019/1019/1019/1019/101 | ilai Comparative Lyampte) | 10.C.Lrc(10)/NFD(50)/80%H-15+10% IPBI+10%ir(ppy)3(36)/ET-2(36)/LiF/A) | No fight emission | | 5.6 | 2.9 | × |
| ITOCACCHO(10)PRQS)0986619-1109/ITOPE 1096/IEPE 2365/IEPA 1016/IEPE 1016/IEPE 1236/IEPA 1 | nal Comparative examples | 11 O/C.ultc(10)/NPD(56)/80%H-20+10%TPB1+10%Ir(ppy)3(36)/ET-2(36)/LiF/Ai | 0.10% | 3.5 | 55 | 9, | , |
| ITOC/CRE(10/PPE)S908661-19-10-07/PBE 10-04/LEQ913-05/FE-12-04/FFA No light emission sign sign sign ITOC/CRE(10/PPE)S9086621-19-10-07/PBE 10-04/LEQ913-05/FE-12-04/FFA No light emission sign sign sign ITOC/CRE(10/PPE)S9086621-1-10-07/PBE 10-04/LEQ913-05/FE-12-04/FFA No light emission sign sign sign ITOC/CRE(10/PPE)S9086621-1-10-07/PBE 10-04/LEQ913-05/FE-12-04/FFA 0.05% ITOC/CRE(10/PPE)S9086621-1-10-07/PBE 10-04/FED913-05/FE-12-04/FFA 0.05% ITOC/CRE(10/PPE)S9086641-1-10-07/PBE 10-04/FED91-05/FE-12-04/FFA 0.05% ITOC/CRE(10/PPE)S9086641-1-10-07/PBE 10-04/FED913-05/FE-12-04/FFA 0.05% ITOC/CRE(10/PPE)S9086641-1-10-04/FED913-05/FE-12-04/FFA 0.05% ITOC/CRE(10/PPE)S9086641-1-10-04/FED913-05/FE-12-04/FFA 0.05% ITOC/CRE(10/PPE)S9086641-1-10-04/FED913-05/FE-12-04/FFA 0.05% ITOC/CRE(10/PPE)S9086641-1-10-04/FED913-05/FE-12-04/FFA 0.05% ITOC/CRE(10/PPE)S908664-1-13-10-04/FED913-05/FE-12-04/FFA 0.05% ITOC/CRE(| nal Comparative Example9 | | 7601.0 | 401 | 3 | 3 6 | ٠ |
| | nal Comparative Example 14 | _ | No light aminima | 1701 | ,, | 67 | ۰, |
| | nal Comparative Example! | | No light or in | | 9.6 | 2 | × |
| | nal Comparative Example 1. | _ | ing tight chassion | | 3.6 | 2 | × |
| ITOC/CAPE(10/NPD[50/890/678-1-08/H1921/450/ET-236/L/EAA | nal Comparative Example 13 | | 0.10% | 2000 | 5.9 | 2.5 | × |
| | nal Comparative Example 14 | 100 | NO LIGHT ETHISSION | | 8.8 | 22 | × |
| Introcursed tolor Programmer 1985 1987 | nal Comparative Example 1 | - | No light emission | | 5.9 | 2.5 | × |
| ITCC.cdet(0)NPD(500804H-24+1094TBH+1094(Epy)3(50/ET-230/LFA) | nal Companyive Example 16 | ITO/O.Po/10/AIDO/SOV808/U 40+108/TRDEL 108/ | 0.30% | 185և | 5.9 | 2.3 | ĸ |
| ITTCCLRet(IO)NPD(50090841-32 + 1094TPBH+1094IL(pp))3(50)ET-2350/LFFA | nal Contuarative Example 1 | TOKPC 100 | 0.60% | 100h | 5.8 | 62 | × |
| TOCACEC (ONPOISO 2008 M. 124-104 (APRIDE) 43 (APRIL P. 243 0) LEFA No light emission 1.7 129 | nal Connarative Evanula 18 | | 0.30% | 40h | 5.8 | 6.2 | × |
| TrOCuze(10/NPD(50/80%H-51+10%TPB+10%H(ppy)3(50/ET-2/39/LF/A) | nal Comparative Exercise | 11.00-0. (10.01) 12.00 000 000 000 1000 1000 1000 1000 1 | 0.20% | 33h | 8.8 | 2.9 | × |
| TroCuefor(UNPDE)20980441-014-1047/PBH-10547(Epp12356)LF/A No light emission | nol Comparative Example 1 | TO CUTC(10) NPU(30) 80/84-31+10% (PHI+10%(IV))3(36)/ET-2(36)/LIF/AI | No light emission | | 5.7 | 8.2 | × |
| TrOCLaPC (10)NPD (20)908/46-46-109/TPB + 10%4(ppp) (36)5/ET-2(36)/LFM | ilai Comparative Examplezo | 11 O/CLFC(10J/NFD(50J/80%H-52+10%1PBI+10%lr(ppy)3(36)/ET-2(36)/LiF/AI | No light emission | | 5.7 | 67 | × |
| TrOCube(10)NPD(50)80564;-10;477BB+10%tTB91/36)ET-3/36)LFA | ind Comparative Examples | 11 O.C.LPC(10J/NPD(50)/80%H-56+10%TPB1+10%Ir(ppy)3(36)/ET-2(36)/LiF/AI | No light emission | | 8 5 | | , |
| ITOCube(10)NPD(50)808/44.10+104/108/1PB+108/41 | nal Comparative Example 2. | 110/CuPc(10)/NPD(50)/80%H-66+10%TPB1+10%Ir(ppy)3(36/VET-2(36/VLIF/AI | 0.40% | 86h | 9 | : | |
| ITOCLDPE(10)APDE/30/80%44-104-10%(TPD/31/30/FT-2/30/LFAA | nal Comparative Example23 | 11TO/CuPc(10)/NPD(56)/80%H-67+10%TPB1+10%Ir(ppy)3(36)/ET-2/36)/LiF/AI | 0.40% | SO. | | | , |
| ITOCCUPC(10)NPD(50)809cH-104+109xTPBH-109x16py13130/ET-2(36)L/E7AI No light emission | nal Comparative Example 24 | ITO/CuPc(10)/NPD(50)/80%H-101+10%TPBI+10%Ir/ppv/3/36)/FT-2/36/J1 iF/A1 | 2000 | 100 | | 2 | × |
| ITCCCuPe(10/NPD[50/80864-118+10%TPBH+10%tItppy)3(36/E-12(36)LF/A) | nal Comparative Example 25 | 11 O/CuPc(10)/NPD/50/80%H-104+10%TPBH+10%H/mm-13434/FFT 7/34/4/104/HPBH+10%H/mm-134/4/FFT 7/34/4/104/HPBH+104/HV/mm-134/4/FFT 7/34/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HV/mm-134/4/HPBH+104/HPBH+104/HV/mm-134/4/HPBH+104 | 1,2078 | | 2.6 | 2 | × |
| ITOCuPe(10)NPD(50)80%H-13+10%1PBH-10%HPBH-10%HPBH-1236)LiFAI | nal Comparative Example 26 | ITO/CiPC(OVNPD/SOVXEL) 184-104/TPB(4-104/Characharden) 200/L1-200/L1-114 | 1.20% | | 53 | 62 | × |
| ITOCLDEQ(Q)NPD(SQ)8096H-137-1095/TPBI+1095/IEQP)3(36)ET-2(36)LiFAI No light emission 6.5 13 | nal Comparative Example 27 | 11 (VC.) P. (() (VID V CO) (() () () () () () () () () () () () | No fight emission | | 5.4 | 2.9 | × |
| ICOCLPC(10)/PDC(50)/80%H-13+10%CPB+10%IC(ppy)3(30/ET-2(36)/LFA) | nal Comparative Frample 28 | 170/0.197(10)(AID)(20)(80/011-137+19/01 FOLT 10/011(DDJ)(3)(3)(2)(2)(2)(114/A) | No light emission | | 5.5 | 8.2 | x |
| ITO/CLPC(10/NPD(50)/809/8-L-10-1109/11991-3(36)/LiFAI | nal Comparative Example 29 | [TOK) P-(10) (10) (10) (10) (10) (10) (10) (10) | No light emission | | 5.5 | 2,9 | × |
| 11 Octore(10)MPD(50)80%4(-204-10%TPB1+10%4(ppy)3(36)FT-2(36)/LiFAI No light emission 5.6 2.9 11 Octore(10)MPD(50)80%4(-204-10%TPB1+10%4(ppy)3(36)FT-2(36)/LiFAI 0.10% 5.6 2.9 11 Octore(10)MPD(50)80%4(-204-10%TPB1+10%4(ppy)3(36)FT-2(36)/LiFAI No light emission 6.1 2.9 11 Octore(10)MPD(50)80%4(-10+10%TAZ+10%4(ppy)3(36)FT-2(36)/LiFAI No light emission 6.1 2.9 11 Octore(10)MPD(50)80%4(-10+10%TAZ+10%4(ppy)3(36)FT-2(36)/LiFAI No light emission 6.1 2.9 11 Octore(10)MPD(50)80%4(-10+10%TAZ+10%4(ppy)3(36)FT-2(36)/LiFAI No light emission 6.1 2.9 11 Octore(10)MPD(50)80%4(-10+10%4(ppy)3(36)FT-2(36)/LiFAI No light emission 6.1 2.9 11 Octore(10)MPD(50)80%4(-10+10%4(ppy)3(36)FT-2(36)/LiFAI No light emission 6.1 2.9 11 Octore(10)MPD(50)80%4(-10+10%4(ppy)3(36)FT-2(36)/LiFAI No light emission 6.1 2.9 11 Octore(10)MPD(50)80%4(-42+10%4(ppy)3(36)FT-2(36)/LiFAI No light emission 6.1 2.9 11 Octore(10)MPD(50)80%4(-42+10%4(ppy)3(36)FT-2(36)/LiFAI No light emission 6.1 2.9 11 Octore(10)MPD(50)80%4(-42+10%4(-42 | Connective Example 30 | 170 (C. B. (10) (10) (10) (10) (10) (10) (10) (10) | No fight emission | | 6.5 | 67 | × |
| ITO/CLDPC(10/NPD(50)/809/84-1204-1094-1094)/3(36)/ET-2(36)/LiFA | ini Collipatative Lyaniples | 11 U.C.C. d. (10)/NP13(30)/8U%H-137+10%17PB(+10%17(ppy)3(36)/ET-2(36)/L.iF/AI | No light emission | | 3,6 | 67 | × |
| ITOCLDP(U)NPD(50)80%4CD-1194-10%1f(ppy)3(30)FE1-2(36)LiFA1 | al Comparative Examples 1 | 11 C/CLIPC(10)/NPU(50)/80%H-202+10%1PBI+10%Ir(ppy)3(36)/ET-2(36)/LIF/AI | %01.0 | ŕ | 9.5 | ,0 | Ţ, |
| ITOC/CIPC(10/NPD(50)/809/R-1-21-10/s/TPB1+10%-It(ppy)3(36)/ET-2(36)/LiFA1 | ital Comparative example32 | 11 C/CuPG 10)/NPD(50)/80%H-204+10%TPBI+10%ir(ppy)3(36)/ET-2(36)/LiF/AI | 0.50% | é | 2 | , | , |
| ITOC/CLPC(10/NPD(50)/80%CD-7+10%TPBH+10%It(ppy)3(36)/ET-2(36)/LFAI | ital Comparative Example33 | 11O/CuPc(10)/NPD(50)/80%H-213+10%TPB(+10%Ir(ppy)3(36)/ET-2(36)/LiF/A) | No light emission | | 1,5 | : | Ţ, |
| ITOCLOPE(10)NPD(59)80%G/XD27+10%TPBI+10%It(ppy)3(36)FET-2(36)/LiFAI | nal Comparative Example34 | ITO/CuPc(10)/NPD(50)/80%BCP+10%ITPBJ+10%Ir(ppy)3(36)/ET-2(36)/IF/A | No light emission | Ī | 3 3 | | Ţ |
| ITOC\(\text{CuPc}(10)\triangle \text{PB}(9)\text{SQ}(9)\text{SQ}(15)\text{FE}(1-2)\text{SQ}\text{F}(17)\text{A}\text | nal Comparative Example35 | ITO/CuPc(10)/NPD(50)/80%OXD-7+10%TPBI+10%Ir(ppv)3/36/JET-2/36/JI IP/AI | No light emission | | | 2 | × |
| ITOCLDPC(10)NPD(50)8096CBP+1096BCP+1094IR(ppy)3(36)/EF-2(36)/LiF/AI | nal Comparative Example36 | ITO/CuPc(10)/NPD(50)/80%TAZ+10%TPBI+10%Ir(pov)3(36)/ET-2/36)/1.jF/A | No light emission | T | 3 | : - | × . |
| ITOCLER(10)NPD(50)80%CB+10%TAZ+10%L(ppy)3(36)FET-2(36)/LiFAI No light emission 5.9 2.3 | nal Comparative Example37 | ITO/CuPc(10)/NPD(50)/80%CBP+10%BCP+10%Inppy]3(36)/ET-2/36)/L [F/A] | 306 | 4505 | 3 | | |
| ITOCLDE(10)NPD(50)80%CBP+10%ITAZ+10%LI(ppy)3(36)/ET-2(36)/Lif7A1 | nal Comparative Example38 | [TO/CuPc(10)/NPD(50)/80%CBP+10%OXD-7+10%L(ppv)3(36)/ET-2(36)/[jP/A] | No light emission | 7 | | 1 | |
| ITOCLPE(10)NPD(50)80%TAZ+10%BCP+10%Lf(ppy)3(36)FT-2(36)LiFA1 | nal Comparative Example39 | ITO/CuPc(10)/NPD(50)/80%CBP+10%17AZ+10%Ir/nnv/3/36\/FT_2/36\// iF/A1 | No light aminging | | a l | 2 | × |
| ITOCLIPE(10)NPD(50)80%CND-7+10%BCP+10%Id(ppy)3(36)FET-2(36)L.IF/AI | nal Comparative Example40 | ITO/CuPc(10)/NPD(50)/80%TAZ+10%BCP+10%lr(ppv)3(36)/FT-2/36)/f iF/A1 | No light emission | | a : | * | × |
| ITOCLEP(10)NPD(50)89%H-10+10%BCP+10%Li(ppy)3(36)/ET-2(36)/LiFAI | nal Comparative Exampled 1 | [TO/CuPa(10)/NPD(50)/80%OXD-7+10%BCP+10%[drav/3/36)/FT-2/36)/J ;F/A1 | No linkt emission | | 3 | * | × |
| ITOC\ Policy\ Pol | nal Comparative Example42 | [TO/CuPc(10)/NPD(50)/80%H-10+10%BCP+10%Ir(nuv)3(36)/ET-2(36)/1 IF/A1 | No Fight enviorien | | 3 | 7 | . |
| ITOC\ CuPe\(10\ NP\ D\(50\)\\ 80\\ 80\\ H-10\+10\\ 80\\ 80\\ H-10\-10\\ 80\\ 80\\ 80\\ H-10\\ 80\\ 80\\ 80\\ 80\\ 80\\ 80\\ 80\\ | nal Comparative Example43 | 11O/CuPc(10)/NPD(50)/80%H-10+10%OXD-7+10%Hrany13/36/JFT-2/26/JF 15/41 | No light emission | | 2.5 | 3.2 | × |
| TOC/CLPC(10)/NPD(50)/80%H-34+10%4BCP+10%4ICppy)3(36)/E1-2(36)/LiF/AI | 181 Comparative Example44 | 11 O/CuPC 101/NPD/50/80%H-10+10%TA7+10%Ir/my/3736/ET | NO HEAL CHURSIUM | | 8 | 8 | × |
| ITO/CuPe(10)/NPD(50)/80%H-3-14-10%L/02-1-10%Lifty) | al Conparative Example45 | 170/O.Per(10)APD\\$0\%0%H 34+1002PH 1002H 1004H 2004H 100 | IVO IIBUL EMISSION | | 5.6 | 5.9 | × |
| ITO/CLIPE(16)/NPDS(50)/80%H-42+10%H-3-10/10/34/Dy3(3)/ET-2(36)/LiPA No light emission | al Comparative Example46 | | 0.10% | 20h | 27 | 27 | × |
| IOC/CuPc(10)NPD(50)/80%4H-48+10%4H-701/3(JEPT-2(36)/LIP/A) | val Contrarative Examine47 | | No light emission | | 5.7 | 20 | × |
| | nal Comparative Example 48 | ITANCIAL TO THE STANDARD TO THE TOTAL AS THE STANDARD STA | No light emission | | 5.7 | \$2 | × |
| IOC/QUPC(10)NPD(50)80%KH-66+10%KH-70+10NI(ppy)3(36)PE1-2(36)/LiF/A No light emission 6.9 2.8 | 18 Connerstive Evennle40 | | No light emission | | 5.9 | 2.7 | × |
| ITO/CLIP(10/INPLQ30934C=14-10%4L-70+ 10%4LiPg)3(36/E-1-2(36/LiF/A) | al Comparative Example 50 | | No light entission | | 5.9 | 2.8 | × |
| 100 Current (of Mrt Ly 10) 100 | al Comparation Evamples | TOC. B-10/Aib-(60) (45 1.00) 14 (45 1.00) 15 (40) 15 (36) (2 (36) (2) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4 | No light emission | - | 5.7 | 21 | × |
| 100/2014 | al Comparative Example 52 | 11 C/Cutr(10/11/ED(30/100 mm-w-10/201-10+10/6/11/ppy)4(30/EL - 2(36/EL)4/A) | 0.90% | 199 199 | 5.9 | 28 | × |
| 11 (70 C. 10 | al Comparative Example 1 | ITOTO INCLUDIO INCLUDIO CONTRACTO INCLUDIO INTERPRESSORIO INCLUDIO | 6.00% | 700h | 5.9 | 2.8 | × |
| | The state of the s | 1 COUNTY (0) 111 COUNTY (0) 1 1 (0) 1 (1) 1 (1) (1) (1) (1) (1) (1) (1) (1 | No links | | | | - |